

Remarks

Claims 1, 10, and 17 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite because the recited molecular weight is not defined by a standard type such as M_w , M_n , etc. In response, claims 1, 10, and 17 are currently amended to recite that the molecular weight is weight average molecular weight (M_w), which is supported by the M_w captions in Tables 1, 2, and 3. Withdrawal of the §112, second paragraph, rejection of claims 1, 10, and 17 is respectfully requested.

Claim 1 is further currently amended to recite that the amphoteric polymer is characterized by a monomeric molar ratio of x/y , in which x corresponds to the mole percentage of the cationic monomer containing a hydrophobic chain, y corresponds to the mole percentage of the anionic monomer, and $y > x$.

This further amendment of claim 1 is fully supported by page 11, lines 16-18, of the instant specification, and by the x/y mole % ratios presented in Tables 1, 2, and 3. Therefore no new matter is introduced by this amendment.

Because the amendment places the claims in better condition for consideration on possible appeal, its admittance is respectfully requested.

Claims 1-11 and 13-17 have been finally rejected under 35 U.S.C. §103(a) as being unpatentable over Huang et al. US 6,702,946 (“Huang”) or Shinkai et al., US 5,683,855 (“Shinkai”) or Ji et al., Gongneng Gaofenzi Xuebao (2003), 16(3), 387-391 (“Ji”). In light of the foregoing amendment of the claims and the remarks that follow, these rejections are respectfully traversed.

Huang is directed to an aqueous dispersion of polymers that comprises (a) a first cationic water-soluble or water-swellaable polymer, (b) at least one second water-soluble polymer different from the first polymer, (c) a kosmotropic salt, and (d) a chaotropic salt (column 3, lines 46-50). The Examiner has equated component (a) of the Huang mixture with the amphoteric polymer of the present invention. However Huang teaches that the aqueous dispersion of polymers with a discontinuous phase that comprises predominately a cationic polymer with a recurring unit of formula (I) (column 3, lines 62-66, emphasis added) Huang further discloses (column 9, lines 1-6) the following:

“On a mole basis, the polymer contains fewer anionic recurring units than cationic units so that the polymer, although ampholytic, retains a net positive cationic charge. Preferably, the polymer contains less than 10 mole % anionic recurring units, based on the total number of recurring units in the polymer.” (emphasis added)

By contrast, instant claim 1 as currently amended recites that that x corresponds to the mole percentage of said cationic monomer containing a hydrophobic chain, y corresponds to the mole percentage of said anionic monomer, and $y \geq x$. Furthermore, previously presented claim 15 is directed to a preferred embodiment wherein the amphoteric polymer comprises between 0.01 and 5 mole % of the hydrophobic cationic monomer and between 10 and 60 mole % of the anionic acidic component. Previously presented claim 16 is also directed to a preferred embodiment wherein the amphoteric polymer comprises between 0.02 and 2 mole % of the hydrophobic cationic monomer and between 10 and 50 mole % of the anionic acidic component. The disclosure of Huang clearly contains no teaching or suggestion of the amphoteric polymeric compositions of the present invention, nor does it provide any motivation to formulate such compositions with the expectation of success.

Shinkai is directed to a printable member whose surface layer is a radiation cured coating that comprises a compound having a quaternary ammonium salt group and a compound having a carboxyl group. The combination of these components are asserted to result in a coating have both water resistance and quick drying properties (column 3, lines 1-27).

It was noted in the Office Action that the coating composition of Shinkai can further include up to 50% of a monomer that may be an acrylamide. However this additional component is “effective for improving the water resistance of a coating to the extent that the physical properties of the coating are not altered even when exposed to running water ...” (column 9, lines 34-37, emphasis added).

It was further noted in the Office Action that the reference appears to be silent regarding molecular weight but that it would be obvious to one skilled in the art to determine “the optimum molecular weight suitable for a coating surface layer...” (emphasis added)

The instant specification on page 1, lines 4-5, recites that “The invention concerns novel associative amphoteric polymers for increasing the viscosity of aqueous solutions...” and on page 17, lines 20-21, further recite that “the polymers in the invention are useful ingredients for

increasing the viscosity of all water-based compositions.” Clearly, the disclosure of Shinkai relating to compositions useful for the coating of quick drying, water-resistant, ink-printable layers is irrelevant to the amphoteric polymeric compositions of the present invention.

Ji relates to solution viscosity studies of water-soluble hydrophobically associating acrylamide/methacrylaminoethyl-dimethylalkyl ammonium bromide/sodium acrylate terpolymers. Inherent viscosities were measured on a series of terpolymers prepared from acrylamide (AM) and methacrylaminoethyl-dimethylalkyl ammonium bromide monomers in a 99.5:0.5 mole ratio, the sodium acrylate component resulting from partial hydrolysis of AM.

Although Ji discloses the initial molar ratio of the monomers AM and methacrylaminoethyl-dimethylalkyl ammonium bromide employed in the synthesis of the copolymer, there is no indication of the extent of AM hydrolysis that would produce the anionic acrylate salt. The disclosure of Ji is limited to a single non-ionic component, acrylamide, and a single anionic component, sodium acrylate, in an undetermined molar ratio to one another. The molar ratio of the anionic sodium acrylate to the methacrylaminoethyl-dimethylalkyl ammonium bromide monomers is likewise undetermined.

As was acknowledged in the Office Action, Ji is silent regarding the relative amounts of each monomer or of the molecular weights of the terpolymers. The Examiner’s acknowledgement of the substantial deficiency of the Ji disclosure concluded with the following statement on page 6 of the Office Action:

“Furthermore, the resultant terpolymer having the recited molecular weight would have been an inevitable consequence of practicing prior art invention. Thus, rendering obvious the present claims.”

The applicants do not understand the meaning of the foregoing statement. However they respectfully assert that the disclosure of Ji provides little guidance for their discovery of the monomeric components, molar ratios, and reaction conditions required to produce their amphoteric polymeric compositions, which can be obtained in a dry powder or particulate form, and which exhibit viscosity-improving capabilities superior to those provided by prior art formulations.

Claims 1-11 and 13-17 remain in this case. In light of the foregoing amendments and remarks, withdrawal of the §103(a) final rejection of the claims as being unpatentable over Huang or Shinkai or Ji is respectfully requested.

If a telephone conference would be helpful in advancing the prosecution of this application, the applicants' undersigned agent invites the Examiner to contact him at the telephone number provided below.

Respectfully submitted,



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